



MATHEMATICS CLASS IX

CHAPTER – 8 QUADRILATERALS

Q.1. The angles of quadrilateral are in the ratio 3: 5: 9: 13. Find all the angles of the quadrilateral.

Q.2. If the diagonals of a parallelogram are equal, then show that it is a rectangle.

Q.3. Show that if the diagonals of a quadrilateral bisect each other at right angles, then it is a rhombus.

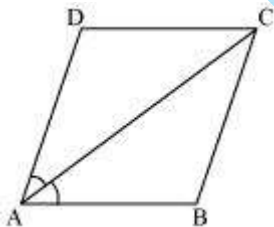
Q.4. Show that the diagonals of a square are equal and bisect each other at right angles.

Q.5. Show that if the diagonals of a quadrilateral are equal and bisect each other at right angles, then it is a square.

Q.6. Diagonal AC of a parallelogram ABCD bisects $\angle A$ (see the given figure).

Show that

- (i) It bisects $\angle C$ also,
- (ii) ABCD is a rhombus.



Q.7. ABCD is a rhombus. Show that diagonal AC bisects $\angle A$ as well as $\angle C$ and diagonal BD bisects $\angle B$ as well as $\angle D$.

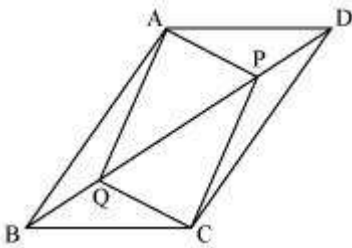


Q.8. ABCD is a rectangle in which diagonal AC bisects $\angle A$ as well as $\angle C$.

Show that:

(i) ABCD is a square (ii) diagonal BD bisects $\angle B$ as well as $\angle D$.

Q.9. In parallelogram ABCD, two points P and Q are taken on diagonal BD such that $DP = BQ$ (see the given figure). Show that:



(i) $\triangle APD \cong \triangle CQB$

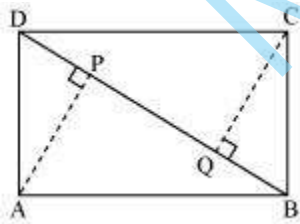
(ii) $AP = CQ$

(iii) $\triangle AQB \cong \triangle CPD$

(iv) $AQ = CP$

(v) APCQ is a parallelogram

Q.10. ABCD is a parallelogram and AP and CQ are perpendiculars from vertices A and C on diagonal BD (See the given figure). Show that



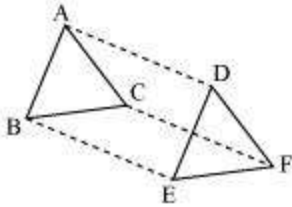
(i) $\triangle APB \cong \triangle CQD$

(ii) $AP = CQ$



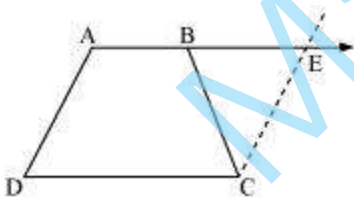
Q.11. In $\triangle ABC$ and $\triangle DEF$, $AB = DE$, $AB \parallel DE$, $BC = EF$ and $BC \parallel EF$.

Vertices A, B and C are joined to vertices D, E and F respectively (see the given figure). Show that



- (i) Quadrilateral ABED is a parallelogram
- (ii) Quadrilateral BEFC is a parallelogram
- (iii) $AD \parallel CF$ and $AD = CF$
- (iv) Quadrilateral ACFD is a parallelogram
- (v) $AC = DF$
- (vi) $\triangle ABC \cong \triangle DEF$.

Q.12. ABCD is a trapezium in which $AB \parallel CD$ and $AD = BC$ (see the given figure). Show that

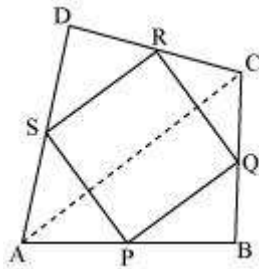


- (i) $\angle A = \angle B$
- (ii) $\angle C = \angle D$
- (iii) $\triangle ABC \cong \triangle BAD$
- (iv) diagonal $AC =$ diagonal BD



[Hint: Extend AB and draw a line through C parallel to DA intersecting AB produced at E.]

Q.13. ABCD is a quadrilateral in which P, Q, R and S are mid-points of the sides AB, BC, CD and DA (see the given figure). AC is a diagonal. Show that:

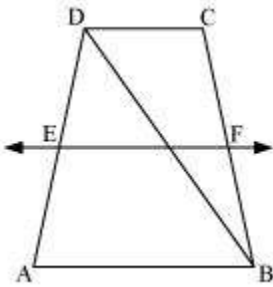


- (i) $SR \parallel AC$ and $SR = \frac{1}{2} AC$
- (ii) $PQ = SR$
- (iii) PQRS is a parallelogram.

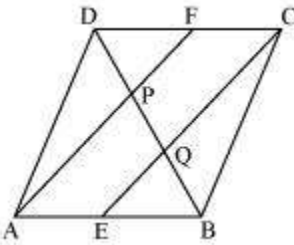
Q.14. ABCD is a rhombus and P, Q, R and S are the mid-points of the sides AB, BC, CD and DA respectively. Show that the quadrilateral PQRS is a rectangle.

Q.15. ABCD is a rectangle and P, Q, R and S are mid-points of the sides AB, BC, CD and DA respectively. Show that the quadrilateral PQRS is a rhombus.

Q.16. ABCD is a trapezium in which $AB \parallel DC$, BD is a diagonal and E is the mid - point of AD. A line is drawn through E parallel to AB intersecting BC at F (see the given figure). Show that F is the mid-point of BC.



Q.17. In a parallelogram ABCD, E and F are the mid-points of sides AB and CD respectively (see the given figure). Show that the line segments AF and EC trisect the diagonal BD.



Q.18. Show that the line segments joining the mid-points of the opposite sides of a quadrilateral bisect each other.

Q.19. ABC is a triangle right angled at C. A line through the mid-point M of hypotenuse AB and parallel to BC intersects AC at D. Show that

(i) D is the mid-point of AC

(ii) $MD \perp AC$

(iii) $CM = MA = \frac{1}{2} AB$